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NEUTROPHIL-LYMPHOCYTE RATIO'S ROLE IN FORETELLING MILD ACUTE PANCREATITIS: TERTIARY CARE CENTRE STUDY.

Gastroenterology

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ABSTRACT

Introduction: Acute pancreatitis is a common presentation of acute abdomen in emergency room. Identifying the patients who might develop severe disease is a challenging task. Neutrophil-Lymphocyte ratio (NLR) is being used in various conditions to predict severity and same has been extended to pancreatitis. **Materials And Methods:** We did as retrospective analysis of patients admitted with mild pancreatitis during the period of March 2021 to July 2022 by comparing the NLR, BISAP score in mild acute pancreatitis. **Results:** There were 26 patients admitted with mild acute pancreatitis during this period, 20 males and 6 females. They belong to mean age group of 39.07years (SD 12.54). Gallstone and alcohol were most common cause of pancreatitis. The mean NLR was 5.78 (SD 3.15). 20 patients had BISAP score of 0. **Conclusion:** NLR is an economical, one time investigation that can be done at the time of admission which can predict severity of pancreatitis. However, optimal cut-off values are yet to be defined.

KEYWORDS

Acute Pancreatitis, Modified Atlanta classification, BISAP score, Ranson score, Imrie score

INTRODUCTION

Acute pancreatitis is one of the common causes of acute abdomen presenting in the emergency room. Around 80-90% of the patients have mild self-limiting courses, the rest 10-20% patients go on to develop severe acute pancreatitis who require high dependency and intensive care support (Papachristou et al., 2010). Classification of pancreatitis is by Revised Atlanta Classification (Banks et al., 2013) as follows,

1. Mild - in the absence of local complications and systemic complications.
2. Moderately severe- in the presence of local complications and/ or transient organ failure.
3. Severe- in the presence of persistent organ failure.

Identifying these patients who progress to severe acute pancreatitis at the time of admission is a challenging task. Various scoring systems have been proposed like Ranson score, Imrie score, Acute Physiology and Chronic Health Evaluation (APACHE II), Sequential Organ Failure Assessment (SOFA) (Schütte & Malfertheiner, 2008). Ranson score and Imrie score contain parameters measured 48 hours after admission, thus risk of progression to severe pancreatitis cannot be assessed at time of admission. APACHE II and SOFA scoring are labour intensive and not specific to pancreatitis. Although serum markers like procalcitonin and interleukin-6 are able to predict severity of pancreatitis (Kylänpää-Bäck et al., 2001), they are not widely used because they are expensive and not readily available. Balthazar and modified CT severity index (Balthazar et al., 1990; Kemppainen et al., 1996) are image based classification systems which identify local complications in order to predict severity. However, local complications do not occur immediately to be visible on imaging.

Bedside Index for Severity in Acute Pancreatitis (BISAP) is a collection of parameters evaluated at the time of admission which can predict risk of severity and mortality. A score of more than 3 had a mortality of 53-60% (Gao et al., 2015). C-reactive protein (CRP) is an acute phase reaction protein elevated in pancreatitis. CRP more than 15mg/dL is being used as a single marker for predicting the severity but delayed elevations after 72hours may be missed during the early period (Gürleyik et al., 2005; Simoes et al., 2011).

Neutrophils are elevated in any inflammatory conditions, they are also found to propagate systemic inflammatory response syndrome (SIRS). Lymphocytes are depleted in sepsis. Combined together, neutrophil lymphocyte ratio is used as a marker for severe sepsis (de Jager et al., 2010; Zahorec, 2001). In pancreatitis peripheral lymphocyte proliferative response is found to be depleted (Pezzilli et al., 1997). Thus, NLR is also being evaluated in predicting the severity of pancreatitis. However, the cut off value varies across the studies (Azab et al., 2011; Bhanou et al., 2018; Jeon & Park, 2017; Kong et al., 2020; Suppiah et al., 2013).

We wish to evaluate the role of NLR at the time of admission in mild and moderately severe pancreatitis and compare with BISAP and CRP levels.

MATERIALS AND METHODS

We retrospectively analyzed the data from the database of patients admitted with pancreatitis. The diagnosis of pancreatitis was based on the clinical symptoms of acute onset of severe upper abdomen pain and serum amylase/ lipase values elevated more than three times the upper limit of normal (Working Group IAP/APA Acute Pancreatitis Guidelines, 2013). At the time of admission routine blood investigations like complete hemogram, CRP, renal function and liver function tests were performed. Chest X-ray and ultrasound of the abdomen were also performed. BISAP score and NLR were calculated at the time of admission. Contrast enhanced CT of abdomen was done after 48hours of symptom onset to look for local complications or earlier in case of diagnostic dilemma. The final assessment of severity was done according to Revised Atlanta classification (Banks et al., 2013). We have compared the values of NLR, BISAP score at the time of admission and their role in mild pancreatitis.

RESULTS

The patients admitted in the period between March 2021 and July 2022 was included in the study analysis. Total of 32 patients were admitted with pancreatitis, 26 patients had pancreatitis with mild severity who we have considered in analysis and the remaining 6 patients had moderately severe or severe pancreatitis. The mean age of patients was 39.07 years (SD 12.54). The mean duration of symptoms before admission was 2days (SD 1day). Out of the 26 patients with mild pancreatitis, 20 were males and 6 were females. The most common causes of pancreatitis were gallstone and alcohol in 8 patients each followed by 7 patients having idiopathic pancreatitis, one patient had hypertriglyceridemia, one patient had chronic kidney disease and one patient had post ERCP pancreatitis. Demographic data has been summarized in Table 1.

NLR and BISAP score was calculated at the time of admission for each patient. The mean and median NLR were 5.78 (SD 3.15) and 5.29 respectively. 20 patients had a BISAP score of 0, 5 patients had a score

of 1 and one patient had a score of 2. Table 2 summarizes the values of NLR and BISAP. Figure 1 shows a chart with plots of the values of NLR and BISAP.

Table 1: Demographic Data Of The Patients.

Parameters	Values
Total number of patients with mild pancreatitis	26
Sex Male Female	 20 6
Age in years Mean SD	 39.07 12.54
Duration of symptoms in days Mean SD	 2 1
Etiology Gallstones Alcohol Idiopathic Hypertriglyceridemia Chronic kidney disease Post ERCP	 8 8 7 1 1 1

Table 2: Summary Of The Results.

Parameters	Values
NLR Mean SD Median	 5.78 3.15 5.29
BISAP (number of patients) 0 1 2	 20 (76.9%) 5 (19.2%) 1(3.8%)

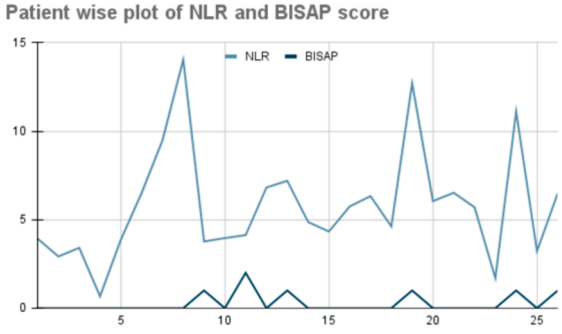

Figure 1: Patient Wise Plot Of NLR And BISAP Score.

Discussion

Acute pancreatitis is one of the common causes of acute abdomen. With the advent of investigations and imaging, diagnosis is no more difficult. However, predicting the severity of pancreatitis at the time of admission has been difficult despite multiple scoring systems. These scoring systems have many disadvantages for example, parameters being evaluated at 48hours in Ranson and Imrie scores, APACHE II score not being specific to pancreas and cumbersome in calculating.

NLR is being studied as a marker of inflammation and as a predictor of severity in various studies. Aravind S et al have reported an optimal cut-off of 10.6 on day 0 as an indicator of favorable outcome (Suppiah et al., 2013). Noor M et al have observed that NLR value of >8.5 correlated with significantly longer hospital and ICU stay (Bhanou et al., 2018). Seung K et al demonstrated that NLR predicted the severity better in gallstone compared to alcohol related pancreatitis (Cho et al., 2018). Tae JJ et al have described a median NLR value of 4.74 in mild acute pancreatitis group in their study (Jeon & Park, 2017). Weihao K et al have conducted a meta-analysis including 10 articles containing 394 patients and concluded that NLR had a moderately high diagnostic value in predicting the severity of acute pancreatitis with a sensitivity of 79% and specificity of 71% (Kong et al., 2020).

In our study, NLR ranged between 0.66 to 14.02 with a median of 5.29 and a mean value of 5.78 (SD 3.15). Mean +/- 1SD ranges between 8.92-2.62 which includes 76.92% of the patients in our series. When BISAP score was considered, 96.1% of patients had a score of 0 or 1 and 3.8% of patients had a score of 2.

Table 3: Comparison Of Results In Various Studies.

Study	Number of patients	NLR cut-off value
Aravind S et al	146	10.6
Noor M et al	107	8.5
Seung KC et al	243	13.8
Tae JJ et al	490	4.74
Our study	26	5.78

Comparing our results with the above discussed studies has been tabulated in table 3. Our observation of NLR as a predictor of severity in mild acute pancreatitis is similar to the studies mentioned above. However, the optimal cut-off value in differentiating mild from moderate and severe acute pancreatitis is arbitrary and varies across the studies. Further prospective studies are needed to provide optimal cut-off values of NLR.

The limitations of our study are that it is a retrospective one. We have considered only mild pancreatitis due to the limited number of patients with moderate and severe acute pancreatitis. With the limited sample size we are not able to derive a cut-off value of NLR below which mild acute pancreatitis could be predicted. With the above results and supporting evidence from other authors, NLR at admission can be considered as a marker for predicting the severity of pancreatitis to stratify patients needing ICU or high dependency unit admissions.

CONCLUSION

Acute pancreatitis being one of the common causes of acute abdomen in the emergency room, predicting the severity and need for ICU care is a challenging task. NLR as a predictor of severity is an economical, one time investigation with good diagnostic yield. The optimal cut-off value in differentiating the mild from moderate and severe pancreatitis is yet to be defined.

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